

Priva NutriFit HX

Product description



The art of having control

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Priva NutriFit HX

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About this product description

This product description concerns the Priva NutriFit, a compact and affordable fertilizer dosing unit. The aim of this product description is to familiarize you with the principle, the construction and operation of the dosing unit. In addition, you can select the entire configuration based on this product description. Furthermore, this product description discusses the pre-conditions for connecting and using the Priva NutriFit.

Explanation of the symbols used in this documentation



Safety warning: risk of physical injury or damage to product, installation or environment.



Warning



Information

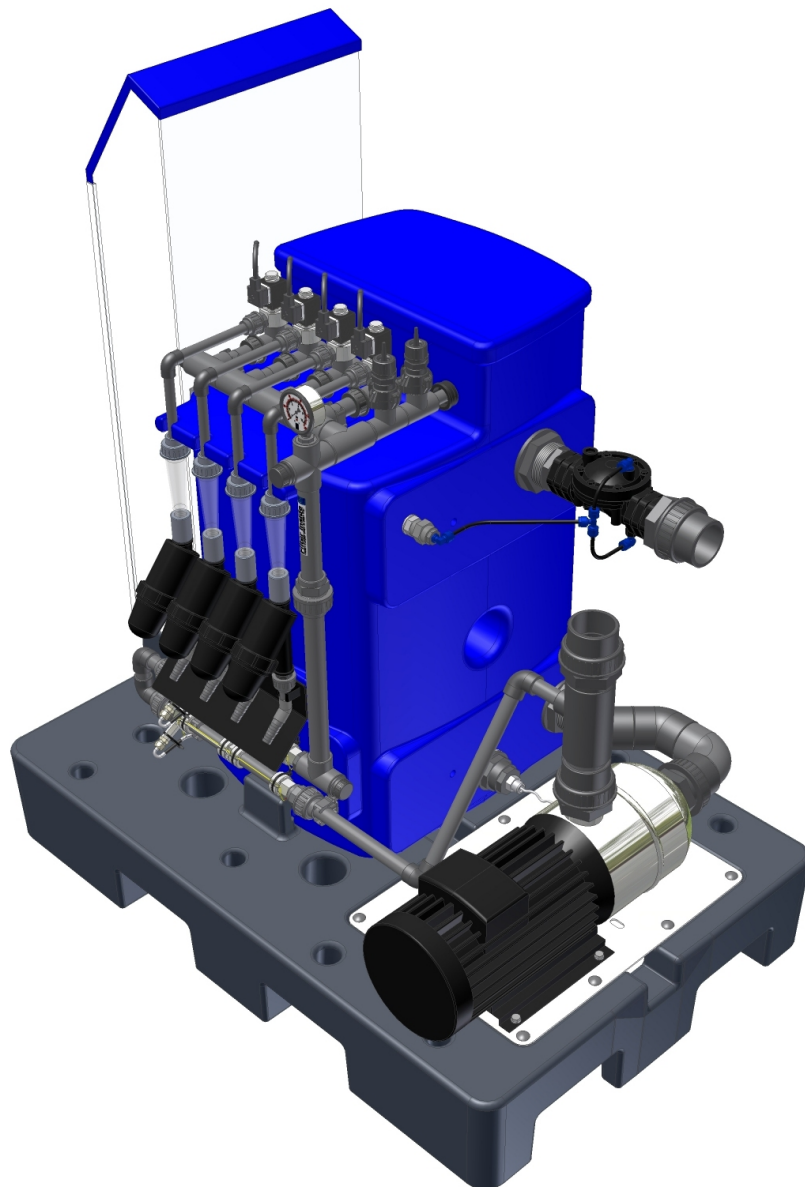


Tip

General description of the Priva NutriFit

An accurate and affordable fertiliser dosing unit

The Priva NutriFit is based on Priva's years of experience with water dosing systems. The NutriFit ensures that stocks of dissolved or liquid fertilisers are optimally mixed with the supply water. The NutriFit has been developed in accordance with modern industrial design methods. The result is a revolutionary and attractive dosage system at an affordable price. Thanks to NutriFit growers anywhere in the world can use an EC and pH controlled fertiliser dosing unit.



Priva NutriFit HX with CHI 20 pump

Modulair construction method

The Priva NutriFit HX is a fertiliser dosing unit with a modular construction on a europallet sized base of light and strong polyethylene. A maximum of four dosage channels are possible, whereby growers can simultaneously dose four fertiliser solutions or three fertiliser solutions and acid/lye. The Nutrifit HX is controlled by a Priva Compri HX 4 computer and is equipped with a graphic, colour touch screen.

Efficient, safe, reliable and environmentally friendly

The dissolved or liquid fertilisers and the acid or lye are optimally mixed with the supply water in the 125 litre capacity mixing tank. The result is a stable, homogenous feeding solution with the desired mixing ratio. This solution is pumped to the crop via one or more distribution channels.

The system is fitted with single or double EC and pH sensors to measure the conductivity (and with it the fertiliser concentration) and the acidity and adjust it to the desired EC and pH value. This ensures optimal growing conditions.

The Priva process computers ensure optimal safety and control. The computers also provide the opportunity to gather current and historical data.

The use of durable materials and the minimum number of moving parts ensures that the system is extremely reliable.



To avoid spillage of valuable water and the dissolved fertilisers that it contains the NutriFit HX can mix previously collected spillage water (drain water) with clean supply water. This makes an average saving of 30-40% on water and fertilisers possible. At the same time it avoids unnecessary pollution of the environment. This option is not a standard feature and requires additional parts / installation work.

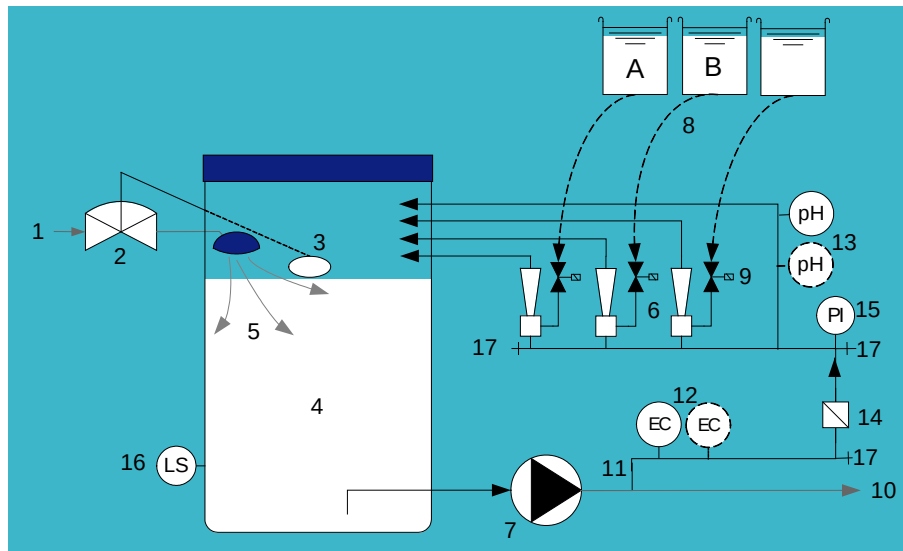
Flexibility and capacity

A Priva NutriFit can be linked to an existing irrigation system. NutriFit can also be integrated into new systems, such as overhead irrigation systems, drip systems and ebb and flow systems for both covered and outdoor crops.

The Priva NutriFit is available with a capacity of approx. 5 - 30 m³ per hour, depending on the pump used. Pumps are available for 50 and 60 Hz mains frequencies. Pumps of 4 kW and higher are fitted with a soft starter. The nominal working pressure is 2.0 to 4.0 bar. The capacity of the dosage channels is 30 - 300 litres per hour.

For all other details please refer to the Dosage channel specifications (page 16), de Priva NutriFit pump specifications (page 18) and the Specifications (page 24).

Working principle of the Priva NutriFit



- | | |
|-----------------------|--------------------------|
| 1. Clean water supply | 10. Irrigation water |
| 2. Inlet valve | 11. Branch |
| 3. Control float | 12. EC sensor |
| 4. Mixing tank | 13. pH electrode |
| 5. Spray head | 14. Strainer |
| 6. Venturi | 15. Pressure gauge |
| 7. System pump | 16. Minimum level switch |
| 8. Stock tanks | 17. Drainage points |
| 9. Dosage valve | |

The clean water supply (1) is connected to the dosing unit. The inlet valve (2) and the control float (3) handle the water supply to the mixing tank (4) and keep the water level in the mixing tank constant. Before the clean water enters the tank, it passes the spray head (5). This spray head ensures an optimal flow in the mixing tank, whereby the water and fertilisers are mixed particularly effectively.

The system pump (7) leads the water from the mixing tank to the crop (10) and a small proportion through the branch (11). In this branch one or two EC sensors (12) and one or two pH sensors (13) are mounted to measure the conductivity and the acidity. The water then flows to the venturis (6). The nozzles in the venturis create a vacuum which ensures that the fertilisers are suctioned through the fertiliser pipe from the supply tanks (8). Dosage valves (9) have been installed in the fertiliser pipe just before the venturis. Based on the EC and pH measurements the control computer determines how much fertiliser is suctioned off by opening and closing the dosage valves.

The screen filter (14) prevents the venturis becoming blocked.

The pressure gauge (15) shows the pressure before the venturis.

The mixing tank is equipped with a minimum level switch (16) that ensures that the system pump can only pump when there is sufficient liquid in the mixing tank. There are ventilation apertures in the edge of the lid on the mixing tank to allow the carbon dioxide gas to escape.

For maintenance purposes the branch contains drainage points (17).

Priva NutriFit Capabilities

General

The most common use of the Priva NutriFit is the direct supply of fertilisers. In doing so the NutriFit feeds the irrigation water containing the dissolved fertiliser(s) via the distribution channels to the various crop departments. The NutriFit can be used for overhead irrigation systems, drip systems and ebb and flow systems. Depending on the crop, one NutriFit can supply nutrient solution(s) to surface areas of approx. 0.5 - 2 ha. In this configuration the NutriFit is only active during irrigation.

For larger surface areas a NutriFit can be used to fill one or more daily stock tanks. This is the so-called indirect method. Here separate pumps and valves transport the fertiliser solution from the day tank to the departments. A NutriFit can make the solution which is then stored in tanks as a buffer stock for a 24-hour period. In this case a NutriFit with a smaller capacity will be sufficient.

For even larger surface areas or under critical cultivation conditions it is recommended that the irrigation water is prepared using two or more NutriFit units. In the event of a breakdown the user can switch over to the other NutriFit and thereby provide the plants with a minimum quantity of irrigation water to prevent damage to the crop.

Basic functions

The construction of the NutriFit makes it suitable for a wide range of functions when watering plants. An overview of the most important functions is shown below.

- Dosing and mixing fertilisers and supply water into a homogenous feeding solution.
- pH and EC correction of the feeding solution.
- Pump the feeding solution to the crop.
- Open system: the spray head of the water inlet is mounted above the level of the irrigation water in the tank. In many cases this is a requirement to allow the NutriFit to be connected to the public water supply.

One or more fertiliser tanks are connected to the NutriFit depending on the number of fertilisers to be dosed. These fertiliser tanks contain fertilisers dissolved in water in such a dilution that they contain no deposit. In determining the irrigation water capacity, account has to be taken of the fact that the maximum dosage capacity of the channels is 300 litres per hour and the minimum dosage capacity is 30 litres per hour.

One of the dosage channels can be used to add acid or lye to the irrigation water. The concentration of the (nitric) acid in the supply solution must not exceed 3% (mass percent) so that there is no negative effect on the service life of the valves.

Advantages of Priva NutriFit

A Priva NutriFit offers countless advantages compared to common fertiliser dosing units

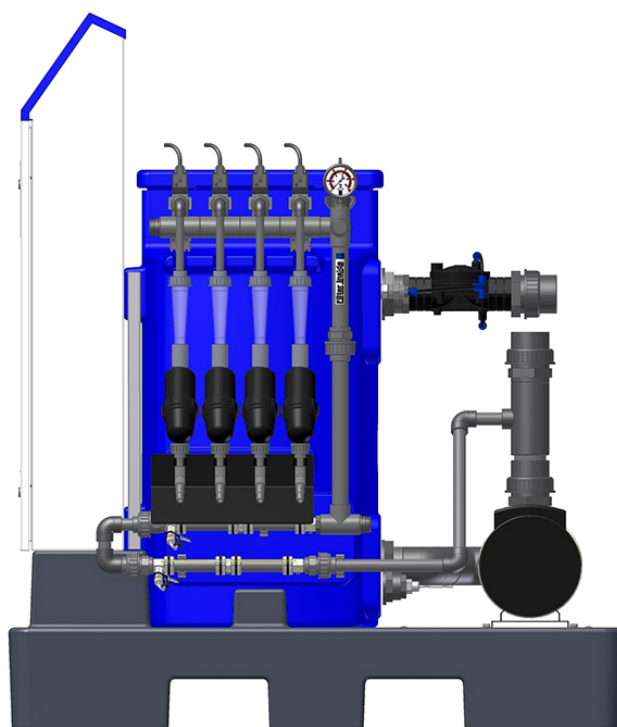
- Outstanding price/quality ratio
- Outstanding mixing characteristics
- Ability to reuse water and fertilisers
- Simple to operate, easy to use
- Easy to connect to existing and new distribution systems
- Made from durable and corrosion-resistant materials
- Minimal number of moving parts
- Little maintenance required, high reliability
- Self-supporting, compact construction method
- Small dimensions 1.24 x 0.85 x 1.41 m (L x W x H)
- Lightweight, 90 - 200 kg (depending on pump and controls)
- Flexible pump capacity from 5 - 30 m³ per hour
- Accurate dosing system with venturis and 1 - 4 dosage channels with a maximum capacity of 300 litres per hour
- Rapid mixing of fertilisers thanks to the special spray head
- Quick recipe change due to low mixing tank capacity
- Ability to dose acid or lye for an optimal pH value
- Double EC and pH measuring possible for maximal accuracy and security

Priva NutriFit HX

The Priva NutriFit HX has an integrated Priva Compri HX 4 process computer. This computer is equipped with a simple to operate and user-friendly, watertight, graphic colour touch screen.

Most important features:

- The valves can be grouped and started based on
 - time.
 - radiation and radiation sum.
 - time and quantity of irrigation water (a flow meter should be fitted for this).
 - external measurements, e.g. the stock tank's level measurement.
- 10 start groups with individual settings for 4 time periods per day.
- 8 fertiliser recipes are possible, where the desired EC and pH value can be regulated per dosage channel.
- Fitted with 1 RO8 module that can control 8 valves as standard.
- As an option a maximum of 4 additional RO8 modules can be fitted to control 32 additional valves. The Priva NutriFit can therefore operate a maximum of 40 valves.
- EC correction based on radiation sum is possible.
- Option to measure the quantity of irrigation water.
- Alarm signal when power is lost, if the NutriFit HX jams (watchdog function) and when an alarm is reported (system alarm, pH alarm, EC alarm, EC pre-control alarm, flow alarm, external stop alarm, sunlight intensity alarm, external start sensor alarm).
- Recording of, amongst other things, the quantity of irrigation water, average EC and pH value, alarms reported during 48 hours.
- The Priva NutriFit HX is supplied with English operating software as standard. Other language versions are available upon request.



Priva NutriFit with CHI 15-20 pump (front view)

Overview of the functions on the Priva NutriFit HX

The table below contains an overview of the functions and options that are available to the Priva NutriFit HX. This table is useful in making the correct choices for a specific configuration.

Feature	
Operation	watertight, colour touch screen with stylus pen
Number of inputs	5 (can be expanded in the switchboard cabinet, e.g. EC pre-control measurement)
Number of outputs	8 (can be expanded to 40)
Number of valves	8 (can be expanded to 40)
Day/week clock	exclude a day of the week
Number of start groups	10 with 4 periods
Start based on radiation sum	yes
Start on external signal	yes
Manual start	yes
Stop on external signal	yes
Manual stop	yes
Number of fertiliser recipes	8
Stock solution selection	no
Dosage channels control	by volume percentage (puls/pause control)
Drain measurement	no
EC pre-regulation (mix spillage water/supply water)	yes (software controlled*)
EC correction based on radiation sum	yes
Rinse valve	no
Rinse sand filter	yes (software controlled*)
Record average pH, EC, volume	current and previous day
Printer connection	no
Computer connection	no
Text processing function (start programmes, valves, fertiliser recipes, alarm texts)	yes
Software language	English (other languages available on request)
Options	1 - 4 additional RO8 modules for each 8 valves; EC pre-regulation*; rinse sand filter*; external measurements

*) EC pre-regulation valve, sand filter and valves not installed on NutriFit HX.

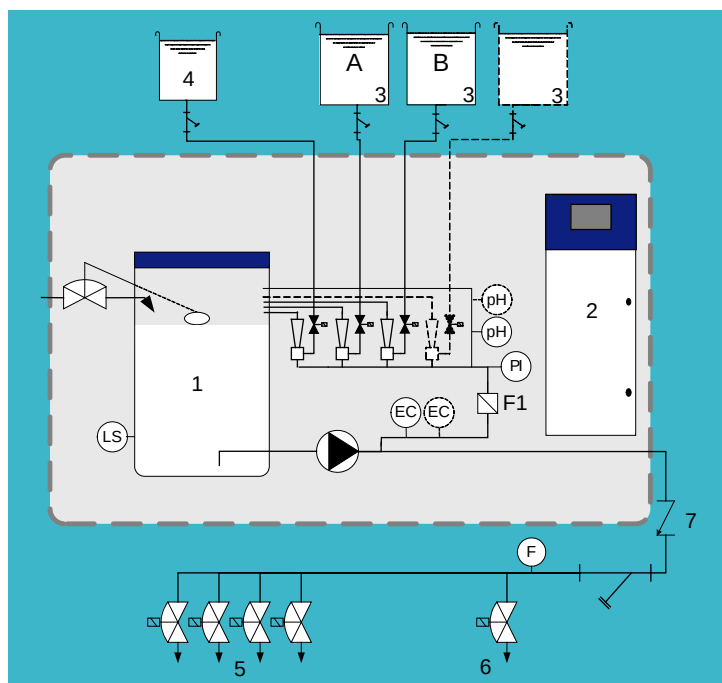
Priva NutriFit fertiliser dosage theory

Fertiliser mixing principles

The Priva NutriFit can be used for two fertiliser mixing principles

- The A+B principle where equal quantities of solutions A and B are dosed. This principle is generally used for soil and substrate cultivation.
- The ABC principle where various fertilisers (nitrogen, phosphorous and potassium for example) are dosed with adjustable ratios. This principle is often used for potted plants.

In both of the cases described above it is assumed that the nominal dilution is 1:100 (fertiliser to water). The dosage channels of Priva NutriFit have been constructed such that the required quantities can be dosed with a high degree of accuracy and uniformity.



The area inside the dashed line shows the scope of delivery of the Priva NutriFit HX.

- | | |
|-------------------------------|----------------------------|
| 1. Mixing tank | 5. Irrigation water valves |
| 2. Control box | 6. Filter |
| 3. Fertilisers stock tanks | 7. Non-return valve |
| 4. Acid/lye stock supply tank | |

Limitations

The maximum capacity of the dosage channels is 300 litres per hour at a minimum working pressure of 2 bar on the venturi. The dosage capacity is almost independent of the working pressure when that is at least 2 bar. At the usual solution of 1 litre of dissolved fertiliser per 100 litres of water approx. 30 m³ of irrigation water can be made per hour.

If less than approx. 30 litres have to be dosed, because small quantities of fertiliser are being applied, then the accuracy of the dosage channels will decrease. In such cases it is recommended that the fertilisers are diluted more thinly, 1:200 for example, instead of the usual 1:100.

Supply water acidity

The supply water of the Priva NutriFit does not always have the correct acidity to produce a stable fertiliser solution. Moreover, certain fertilisers require a specific pH value for optimal functioning. To this end the supply water, depending on the crop, has to be brought to approx. 5.5 if:

- the supply water contains high a concentration of bicarbonate (HCO_3^-),
- the supply water has been processed by deironing and therefore has a high pH value.

Lowering the pH value can be accomplished in several ways:

- by the dosing unit,
- by additional equipment that has been placed between the dosing unit and the water supply.

Lowering the pH value by the dosing unit

With bicarbonate concentrations of 1 - 1.25 mmol/l one dosage channel on the NutriFit can be used to acidify the supply water if necessary. The neutralization process runs more quickly according to how well the carbon dioxide gas created is discharged (by aeration or spraying with water for example).



The supply water may contain elements that can bind acid, such as bicarbonate. This causes the pH to change far less than one would expect based on the amount of acid that has been dosed. Elements that play an important role in this respect are phosphate and bicarbonate. These elements may be present in the supply water as well as in fertiliser solutions.

Lowering the pH value by other equipment

When the bicarbonate concentration is greater than 1.25 mmol/l the supply water has to undergo a pre-treatment. Excess bicarbonate can be removed with nitric acid, phosphoric acid or a mixture of both to make a stable fertiliser solution. The Priva Neutralizer is the recommended device for treating supply water with an excessive concentration of bicarbonate and to obtain a stable pH value. This will result in improved growth due to the plant's increased uptake of fertiliser. In addition there will be less contamination and/or blockages in the entire distribution system.



When creating stock solutions of acid the user should always add acid to the water and not vice versa due to the large amount of heat that is generated during dilution. This can lead to acid spatters and thereby to injuries and damage to the surrounding equipment.

Priva NutriFit pH measurement

The Priva NutriFit is equipped with one or two pH sensors to monitor the pH value of the fertiliser solution. In many cases a single pH sensor will be more than sufficient. Installing a second pH sensor is recommended however to prevent damage to the crop. When using two pH sensors both sensors should, in principle, show the same value. Because of aging or other influences one of the two sensors could show a different reading to the other one. When that happens the process computer will generate an alarm signal to warn the user that something is wrong.

Priva NutriFit EC measurement

The Priva NutriFit is equipped with one or two temperature compensated EC sensors ¹⁾ to monitor the electrical conductivity of the irrigation water and thereby the presence of salts (fertilisers) in it. In many cases a single EC sensor will be more than sufficient. Installing a second EC sensor is recommended however to prevent damage to the crop. When using two EC sensors both sensors should, in principle, show the same value. Because of aging or other influences one of the two sensors could show a different reading to the other one. When that happens the process computer will generate an alarm signal to warn the user that something is wrong.

1) The sensor's EC measurement depends on the water temperature.

Priva NutriFit supply water pressure

The supply water pressure of the Priva NutriFit must be between 2.0 and 3.0 bar. Should the supply pressure be higher than 3.0 bar, measures should be taken to bring the pressure to between 2.0 and 3.0 bar. This can be achieved using a pressure regulator, amongst other things. The supply pressure must not fall below 2.0 bar as this will jeopardize the irrigation water capacity ¹⁾. In that case using a buffer vat, basin or tank with feed/force pump is the solution.

1) The volume capacity of the supply water system must be at least equal to the quantity of irrigation water to be produced.



The supply water pressure at the inlet valve must only be present when the NutriFit is active, i.e. when feed solution is actually being pumped. At all other times the water supply should be switched off, using an electric valve in the supply circuit for example.

Sand and sieve filters for the Priva NutriFit

Filters may be required to filter organic dirt and/or undissolved substances out of the water depending on the quality of the supply water. Sand filters and/or sieve filters can be used to do this.

Sand filter

A sand filter is used when the supply water contains large amounts of organic substances such as algae or plant remnants. The following operational conditions apply to a sand filter:

- Flow rate of water through the sand filter approx. 40 - 50 metres per hour.
- Rinse water speed approx. 200 - 300 metres per hour to achieve approx. 15% expansion in the sand bed.
- Grain size of the sand approx. 1 - 2 mm.
- Thickness of the sand bed approx. 40 cm.

After the sand has been rinsed out to its nominal capacity there will be a pressure drop of approx. 0.5 bar across the sand bed. For further details please refer to the user instructions and other documentation from the filter supplier.



A multi-layer filter can be used for large quantities of suspended particles, such as a filter of anthracite, sand and gravel.

Sieve filter

A sieve filter is then used when the supply water contains a large number of hard and coarse particles. The following pre-conditions apply for a sieve filter:

The following operational conditions apply to a sieve filter:

- The flow rate of water through the filter depends on the type of filter.
- Automatic or manual cleaning during use.
- Filter made from stainless steel or a synthetic material with a pore size of approx. 75 to 500 micrometres, depending of the type of water supply and water distribution.



Filters must be cleaned regularly. The frequency depends on the degree of contamination of the supply water. Refer to the user instruction of the filter concerned or contact your supplier.



When the filter is installed after the Priva NutriFit there must be a strainer/pre-filter before the NutriFit with a maximum passage size of 2 mm.

Installing Priva NutriFit fertiliser tanks

The following aspects should be taken into account when installing fertiliser, acid and/or lye tanks on the Priva NutriFit:

1. Ensure that there is sufficient free working space between the fertiliser tanks and the NutriFit.
2. Ensure that the supply pipes between the fertiliser tank and the NutriFit are as short as possible for a maximum dosage capacity. Keep the pipes shorter than 8 metres in any event.
3. Ensure that the fertiliser tanks are at least on the same level as the NutriFit so that the maximum suction capacity can be used.
4. The fertilisers can best be suctioned off from a height of approx. 5 cm above the bottom of the fertiliser tank. This prevents sediment from being suctioned off the bottom which reduces the risk of blockages.

The dimensions of all components that are installed for the fertiliser storage and the entire pipe path between the fertiliser tank and the venturi must be completely identical for all tanks to support the balanced level.

Connecting Priva NutriFit fertiliser hoses

The hose connection for the fertiliser supply is equipped with a hose connection for hoses with an internal diameter of 15 mm. For the fertiliser supply use a reinforced (PVC) water hose of Ø 15 x 20.5 mm for dosage channels with a capacity of 300 litres/hour. Use stainless steel hose clamps (stainless steel 316; material 1.4401) which close securely for the fertiliser hose connections.

The following components must be included in the fertiliser pipe (refer also to the user manual):

1. The components in the fertiliser pipes must be fitted with EPDM sealing material to be resistant to weak acid and alkali fertiliser solutions.
2. A filter in the fertiliser pipe between the fertiliser tank and the venturi. This must contain a sieve that does not permit passage of particles larger than 500 micron.
3. A non-return valve; non-return valve and filter can be used in combination.
4. Shut-offs must be included in the fertiliser supply pipes in order to be able to safely carry out maintenance (cleaning filters and/or venturis for example).

Fertiliser filters

Filtering the fertiliser solutions is crucial in preventing blockages in and damage to the dosage channels. Incompletely dissolved fertilisers, sand grains or crystals that have formed in the supply pipes can damage the dosage valve seating and the dosage valve membrane. These defects must be prevented by careful filtering and are not covered by the warranty. The fertilisers can best be filtered directly at the stock tanks. In addition, the dosage valves can be protected by a second fine-mesh filter immediately before the fertiliser connections on the NutriFit.

Preventing air bubbles

Fertiliser pipes must be installed in such a way that no air bubbles remain in the pipes, but are immediately removed via the venturis.

Dosage channel specifications

Description	Dosage channel	Dosage channel with filter	Dosage channel with flow meter	Dosage channel with filter and flow meter
				
Article number	752351 (50 Hz) 752352 (60 Hz)	752353 (50 Hz) 752354 (60 Hz)	752355 (50 Hz) 752356 (60 Hz)	752357 (50 Hz) 752358 (60 Hz)
Filter	N/A	130 µm	N/A	130 µm
Flow meter	N/A	N/A	0..300 litres/hour	0..300 litres/hour
Dosage valve	valve 24 Vac/50 Hz, 8 W, Geva EPDM valve 24 Vac/60 Hz, 8 W, Geva EPDM			
Dosage valve supply voltage	24 Vac			
Dosage valve signalling	LED (red)			
Dosage valve maximum power consumption	0.60 A			
Dosage valve sealing material	EPDM			
Diameter for fertiliser supply connection	Ø 16 mm			
Dosage channel capacity	30-300 litres/hour			
Liquids to be used	Fertilisers, lye and thinly diluted acid (concentration of nitric acid < 3% (mass percentage))			

Priva NutriFit irrigation water capacity calculation

The following details should be known in order to select the correct pump for the calculated irrigation water capacity.

- The required system pressure
- The number of dosage channels
- Acid/lye dosing yes/no

The irrigation water capacity is calculated based on the total water requirement and the required capacity for the water distribution system that has to be served.

The system pressure required depends on the pressure that is required by the drip or spray system used. The pressure that has to be supplied by the Priva NutriFit is the sum of the previously mentioned pressure and the pressure loss in the dosage channel (acid/lye/fertiliser valve, filter and pipes).

Calculation example

Data	Value
Total cultivation surface area	6000 m ²
Cultivation surface area per distribution channel	2000 m ²
Desired maximum water dose	10 litres / m ² / day
Number of drippers	6 per m ²
Dripper capacity	1.5 litres / hour

Data	Value
Total water dose	60 m ³ / day
Dosage capacity	9 litres / m ² / hour = 18 m ³ / distribution channel / hour
Total dosage time	60 / 18 = 3.33 hours / day
NutriFit capacity required ¹⁾	18 m ³ / hour

1) Ensure that the number and type of dosage channels is known. Based on the calculated capacity select a suitable pump from the Priva NutriFit pump specifications (page 18) chapter. When doing so pay attention to the correct mains frequency of 50 or 60 Hz.

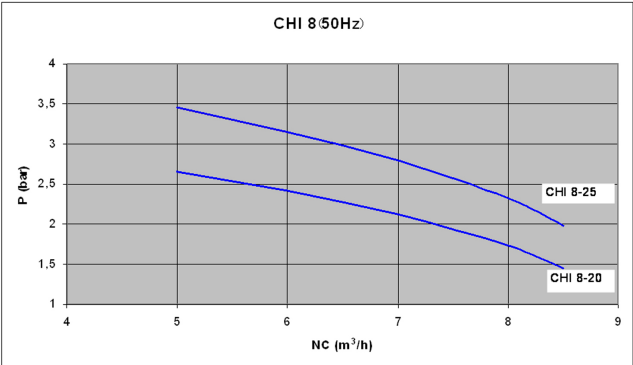
Cycle time and repetition frequency

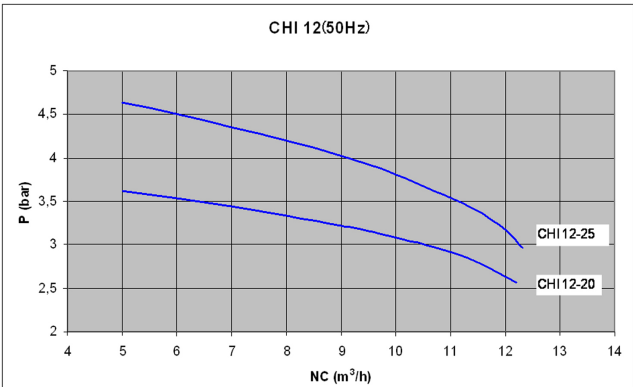
Data	Value
Dripper capacity per dosage	100 ml
Number of drippers	6 per m ²
Water dose per cycle	6 x 100 x 2000 x 3 = 3.6 m ³
Cycle time	3.6 / 18 = 12 minutes
Repetition frequency	5x per hour (with 3 distribution channels and 100 ml / dripper)

Priva NutriFit pump specifications

-  When using two or four dosage channels there is a loss or gain in pump capacity of 0.5 m³ per hour. To this end read the graph 0.5 m³ lower or higher than the calculated value.
-  The Priva NutriFit is built to a maximum pump capacity of 30 m³/hour. In order to ensure optimal mixing the minimum pump capacity should be 5 m³/hour.
-  When the capacity of the pump that is fitted is too high there is a risk of leaks and damage to the NutriFit. In addition, the power consumption will be unnecessarily high.

50 Hz pumps

Description	Grundfos CHI 8-20	Grundfos CHI 8-25
Article number	8661	8662
Mains voltage	380-415 Vac (50 Hz)	380-415 Vac (50 Hz)
Pump switch	star	star
Maximum power consumption (excluding NutriFit)	1.4 kW	1.7 kW
Motor start switch	yes	yes
Thermal overload protection	PKZM 2.5-4.0 A	PKZM 2.5-4.0 A
Pump characteristics (pump incl. NutriFit with 3 dosage channels, T=20° C)		

Description	Grundfos CHI 12-20	Grundfos CHI 12-25
Article number	8666	8667
Mains voltage	380-415 Vac (50 Hz)	380-415 Vac (50 Hz)
Pump switch	star	star
Maximum power consumption (excluding NutriFit)	2.3 kW	2.8 kW
Motor start switch	yes	yes
Thermal overload protection	PKZM 4.0-6.3 A	PKZM 4.0-6.3 A
Pump characteristics (pump incl. NutriFit with 3 dosage channels, T=20° C)		

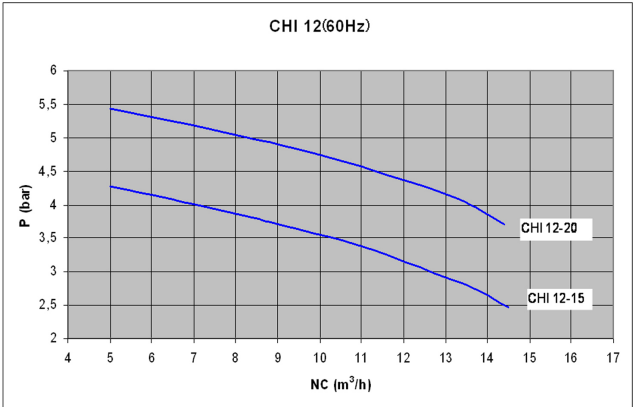
Description	Grundfos CHI 15-20	Grundfos CHI 15-30																		
Article number	8671	8672																		
Mains voltage	380-415 Vac (50 Hz)	380-415 Vac (50 Hz)																		
Pump switch	star	star																		
Maximum power consumption (excluding NutriFit)	1.9 kW	2.8 kW																		
Motor start switch	yes	yes																		
Thermal overload protection	PKZM 4.0-6.3 A	PKZM 4.0-6.3 A																		
Pump characteristics (pump incl. NutriFit with 3 dosage channels, T=20° C)	CHI 15(50Hz) <table border="1"> <caption>Approximate data points for CHI 15(50Hz)</caption> <thead> <tr> <th>NC (m³/h)</th> <th>CHI 15-30 P (bar)</th> <th>CHI 15-20 P (bar)</th> </tr> </thead> <tbody> <tr><td>5</td><td>3.7</td><td>2.5</td></tr> <tr><td>10</td><td>3.3</td><td>2.2</td></tr> <tr><td>15</td><td>2.9</td><td>1.9</td></tr> <tr><td>20</td><td>2.5</td><td>1.6</td></tr> <tr><td>21</td><td>2.2</td><td>1.4</td></tr> </tbody> </table>		NC (m³/h)	CHI 15-30 P (bar)	CHI 15-20 P (bar)	5	3.7	2.5	10	3.3	2.2	15	2.9	1.9	20	2.5	1.6	21	2.2	1.4
NC (m³/h)	CHI 15-30 P (bar)	CHI 15-20 P (bar)																		
5	3.7	2.5																		
10	3.3	2.2																		
15	2.9	1.9																		
20	2.5	1.6																		
21	2.2	1.4																		

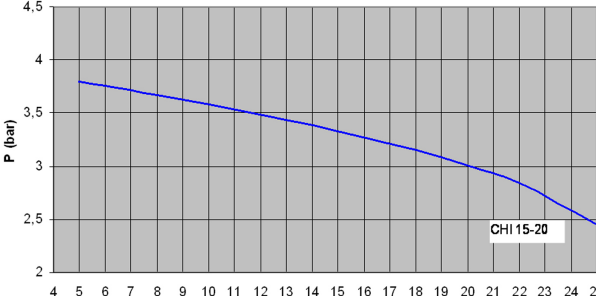
Description	Grundfos CHI 20-20	Grundfos CHI 20-30																					
Article number	8676	8677																					
Mains voltage	380-415 Vac (50 Hz)	380-415 Vac (50 Hz)																					
Pump switch	star	star																					
Maximum power consumption (excluding NutriFit)	2.1 kW	3.0 kW																					
Motor start switch	yes	yes																					
Thermal overload protection	PKZM 4.0-6.3 A	PKZM 6.3-10 A																					
Pump characteristics (pump incl. NutriFit with 3 dosage channels, T=20° C)	CHI 20(50Hz) <table border="1"> <caption>Approximate data points for CHI 20(50Hz)</caption> <thead> <tr> <th>NC (m³/h)</th> <th>CHI 20-30 P (bar)</th> <th>CHI 20-20 P (bar)</th> </tr> </thead> <tbody> <tr><td>5</td><td>4.0</td><td>2.6</td></tr> <tr><td>10</td><td>3.6</td><td>2.3</td></tr> <tr><td>15</td><td>3.2</td><td>2.0</td></tr> <tr><td>20</td><td>2.8</td><td>1.7</td></tr> <tr><td>25</td><td>2.4</td><td>1.4</td></tr> <tr><td>26</td><td>2.1</td><td>1.2</td></tr> </tbody> </table>		NC (m³/h)	CHI 20-30 P (bar)	CHI 20-20 P (bar)	5	4.0	2.6	10	3.6	2.3	15	3.2	2.0	20	2.8	1.7	25	2.4	1.4	26	2.1	1.2
NC (m³/h)	CHI 20-30 P (bar)	CHI 20-20 P (bar)																					
5	4.0	2.6																					
10	3.6	2.3																					
15	3.2	2.0																					
20	2.8	1.7																					
25	2.4	1.4																					
26	2.1	1.2																					

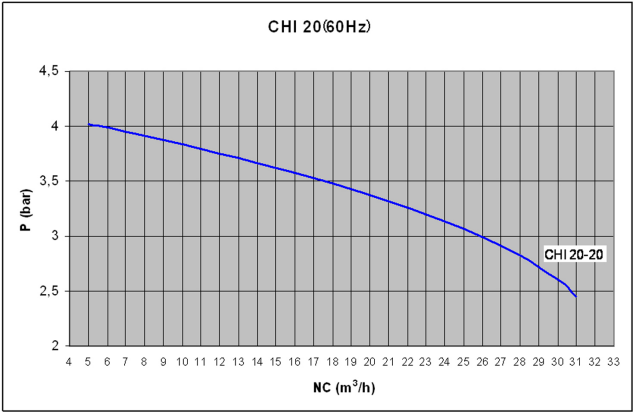
Description	Grundfos CR 32-2-2	Grundfos CR 32-2	Grundfos CR 32-3-2	Grundfos CR 32-3
Article number	8681	8682	8683	8684
Mains voltage	380-415 Vac (50 Hz)	380-415 Vac (50 Hz)	380-415 Vac (50 Hz)	380-415 Vac (50 Hz)
Pump switch	delta	delta	delta	delta
Maximum power consumption (excluding NutriFit)	3.0 kW	4.0 kW	5.5 kW	5.5 kW
Motor start switch	yes	soft starter	soft starter	soft starter
Thermal overload protection	PKZM 6.3-10 A	PKZM 6.3-10 A	PKZM 10-16 A	PKZM 10-16 A
Pump characteristics (pump incl. NutriFit with 3 dosage channels, T=20° C)				

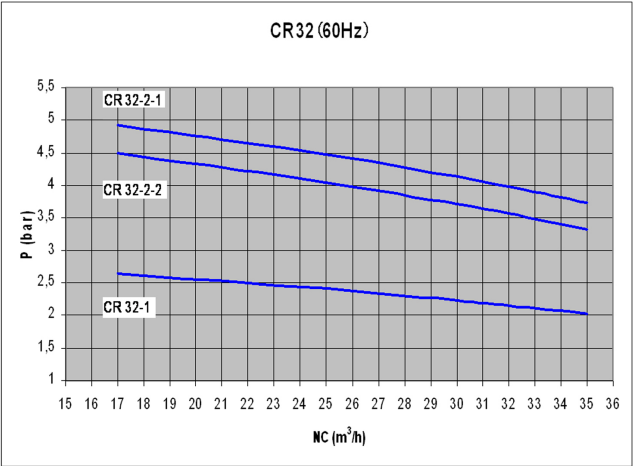
60 Hz Pumps

Description	Grundfos CHI 8-15	Grundfos CHI 8-20
Article number	8663	8664
Mains voltage	346-380 Vac (60 Hz)	346-380 Vac (60 Hz)
Pump switch	star	star
Maximum power consumption (excluding NutriFit)	1.8 kW	2.3 kW
Motor start switch	yes	yes
Thermal overload protection	PKZM 2.5-4.0 A	PKZM 4.0-6.3 A
Pump characteristics (pump incl. NutriFit with 3 dosage channels, T=20° C)		

Description	Grundfos CHI 12-15	Grundfos CHI 12-20												
Article number	8668	8669												
Mains voltage	346-380 Vac (60 Hz)	346-380 Vac (60 Hz)												
Pump switch	star	star												
Maximum power consumption (excluding NutriFit)	2.7 kW	3.9 kW												
Motor start switch	yes	yes												
Thermal overload protection	PKZM 4.0-6.3 A	PKZM 6.3-10 A												
Pump characteristics (pump incl. NutriFit with 3 dosage channels, T=20° C)	 The graph shows the performance of the Grundfos CHI 12(60Hz) pump. The y-axis represents pressure P in bar, ranging from 2 to 6. The x-axis represents flow rate NC in m³/h, ranging from 4 to 17. Two curves are shown: the upper curve is for the CHI 12-20 model, and the lower curve is for the CHI 12-15 model. Both curves show a decrease in pressure as the flow rate increases. <table border="1"> <caption>Approximate data points from the CHI 12(60Hz) graph</caption> <thead> <tr> <th>Flow Rate NC (m³/h)</th> <th>Pressure P (bar) - CHI 12-20</th> <th>Pressure P (bar) - CHI 12-15</th> </tr> </thead> <tbody> <tr><td>5</td><td>5.5</td><td>4.3</td></tr> <tr><td>10</td><td>4.8</td><td>3.5</td></tr> <tr><td>15</td><td>3.8</td><td>2.8</td></tr> </tbody> </table>		Flow Rate NC (m³/h)	Pressure P (bar) - CHI 12-20	Pressure P (bar) - CHI 12-15	5	5.5	4.3	10	4.8	3.5	15	3.8	2.8
Flow Rate NC (m³/h)	Pressure P (bar) - CHI 12-20	Pressure P (bar) - CHI 12-15												
5	5.5	4.3												
10	4.8	3.5												
15	3.8	2.8												

Description	Grundfos CHI 15-20	Grundfos CHI 15-20												
Article number	8673	8674												
Mains voltage	440-480 Vac (60 Hz)	208-230 Vac (60 Hz)												
Pump switch	star	double star												
Maximum power consumption (excluding NutriFit)	2.8 kW	2.8 kW												
Motor start switch	yes	yes												
Thermal overload protection	PKZM 4.0-6.3 A	PKZM 10-16 A												
Pump characteristics (pump incl. NutriFit with 3 dosage channels, T=20° C)	CHI 15(60Hz)  The graph shows the performance of the Grundfos CHI 15(60Hz) pump. The y-axis represents pressure P in bar, ranging from 2 to 4.5. The x-axis represents flow rate NC in m³/h, ranging from 4 to 25. A single curve is shown for the CHI 15-20 model, showing a decrease in pressure as the flow rate increases. <table><caption>Approximate data points from the CHI 15(60Hz) graph</caption><thead><tr><th>Flow Rate NC (m³/h)</th><th>Pressure P (bar) - CHI 15-20</th></tr></thead><tbody><tr><td>5</td><td>3.8</td></tr><tr><td>10</td><td>3.5</td></tr><tr><td>15</td><td>3.2</td></tr><tr><td>20</td><td>2.8</td></tr><tr><td>25</td><td>2.4</td></tr></tbody></table>		Flow Rate NC (m³/h)	Pressure P (bar) - CHI 15-20	5	3.8	10	3.5	15	3.2	20	2.8	25	2.4
Flow Rate NC (m³/h)	Pressure P (bar) - CHI 15-20													
5	3.8													
10	3.5													
15	3.2													
20	2.8													
25	2.4													

Description	Grundfos CHI 20-20
Article number	8678
Mains voltage	440-480 Vac (60 Hz)
Pump switch	delta
Maximum power consumption (excluding NutriFit)	3.6 kW
Motor start switch	yes
Thermal overload protection	PKZM 4.0-6.3 A
Pump characteristics (pump incl. NutriFit with 3 dosage channels, T=20° C)	 CHI 20(60Hz)

Description	Grundfos CR 32-1	Grundfos CR 32-2-2	Grundfos CR 32-2-1
Article number	8686	8687	8688
Mains voltage	380-480 Vac (60 Hz)	380-480 Vac (60 Hz)	380-480 Vac (60 Hz)
Pump switch	delta	delta	delta
Maximum power consumption (excluding NutriFit)	3.0 kW	5.5 kW	5.5 kW
Motor start switch	yes	soft starter	soft starter
Thermal overload protection	PKZM 4.0-6.3 A	PKZM 10-16 A	PKZM 10-16 A
Pump characteristics (pump incl. NutriFit with 3 dosage channels, T=20° C)	 CR32 (60Hz)		

Maintenance

Carry out the scheduled maintenance, for instance during crop changes.

Maintenance to be carried out by the user

Action	frequency
check the water dose for the plants (for example, for each irrigation valve place one dripper in a measuring beaker so it is clear how much water is being given)	at least once a week
keep the dosing system and the immediate surroundings clean (remove dust, water and chemicals)	at least once a week
check the fertiliser pipes for leaks	at least once a week/month
clean the screen filter	at least once a month
clean the disc filters in the dosage channels (if applicable)	at least once a month
check the whole installation for leaks and air bubbles in fertiliser pipes	at least once a month
check the pump pressure	at least once a month
calibrate the pH-sensor	at least once a month
if applicable: clean the lens of the linear photoelectric cell	at least once a year

Maintenance to be carried out by the fitter/service engineer

Action	frequency
check the fertiliser pipes for leaks	at least once every year
adjust the control float in the mixing tank	at least once every year
clean the flow meter	at least once every year
calibrate the EC sensor	at least once every year
maintain the dosage channels	at least once every year
replace the back-up battery on the Compri HX 4 control computer	at least once every 5 years



Use a Priva EC/pH Measuring Case (article number 3779190) to calibrate the EC and pH sensors.

Specifications

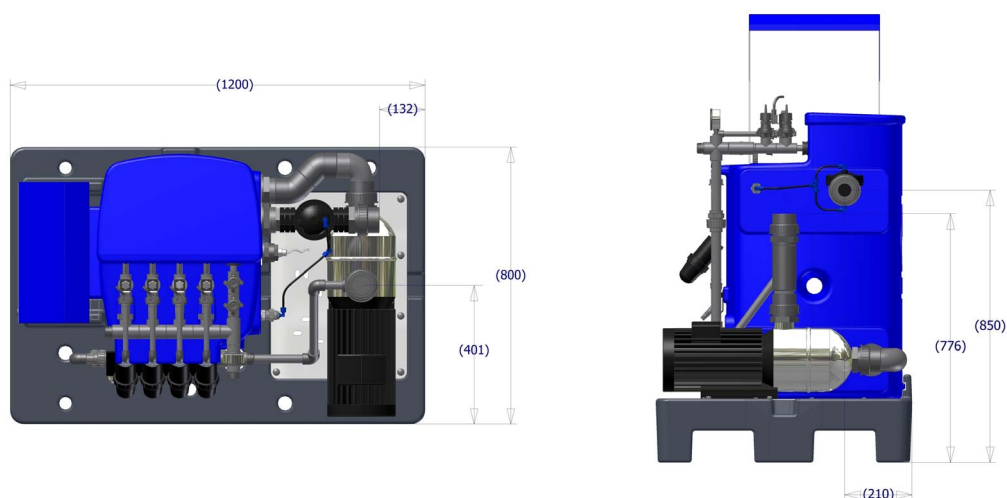
Specifications (general)

Specifications (general)	
Product number	752370
Design options	dosage channel pump and electrical components filter flow meter number of irrigation valves for RO-8 relay-output modules
Operating principle	mixing tank
Capacity	5 - 30 m ³ / hour
Inline version	yes
Bypass version	no
Mixing tank (capacity)	approx. 125 litres
Maximum number of dosage channels	4
Capacity per dosage channel	30 - 300 litres/hour
pH-measuring device	1 or 2
EC measuring device	1 or 2
Light measurement (to influence the start time)	extra
External start contact	extra
Pressure measuring device (for visual monitoring)	yes
EC-mark	Machine Directive Low voltage guidelines EMC standards applicable within the EU as such are compliant with CE standards

Specifications (assembly and environment requirements)

Assembly and environment requirements	
Required positioning	Inside, ventilated location without drip water and splash water, switch box may not be in direct sunlight
Permissible ambient temperature normal operation	5 to 30 °C
Permissible relative humidity environment	< 85 % at 30 °C (non condensing)
Protection level	IPX4
Permitted ambient pollution	Pollution Degree 2
Permitted transport/storage temperature	0 .. 70 °C

Specifications (mechanical)



Priva NutriFit HX with CHI 15-20 pump (top and side view)

Specifications (mechanical)	
Construction	frame mixing tank pipes switch box with controls
Frame material	PE
Mixing tank material	PE
Pipe material	PVC
Switch box material	sheet steel
Dimensions excl. packaging	120 x 137 x 80 cm (WxHxD)
Dimensions incl. packaging	124 x 141 x 85 cm (WxHxD)
Weight excl. system pump	approx. 75 kg
Weight incl. pump and packaging	maximum 200 kg

Specifications (water installation section)

Description	
System pump	The pump specifications can be found in the Priva NutriFit pump specifications (page 18) chapter.
Safety devices	minimum level switch in the mixing tank
Permissible water supply pressure	2..3 bar
Diameter of water supply/discharge connection	Ø 63 mm
Fertiliser mixing principle	A + B principle (equal quantities of fertilisers) ABC principle (variable ratio between fertiliser volume flows)
Dosage channel (see also Dosage channel specifications (page 16))	choice of: • dosage channel • dosage channel with filter • dosage channel with flow meter • dosage channel with filter and flow meter
Diameter of the irrigation water connection	depends on pump

Specifications (electrical)

Specifications (electrical)	
Mains voltage	3 phase, neutral and earth 400 Vac ($\pm 10\%$); 50 Hz / 60 Hz
Maximum power consumption	depends on the system pump, refer to the specification sticker on the switch box
External fuse requirement	16 A(T) for each phase
CE mark	EMC standards applicable within the EU as such are compliant with CE standards
Insulation class	I (basic insulation with protection wiring)
Installation class	installation category (overvoltage category) II
Available inputs and outputs	1 SO-8 triac output module (for dosage valves) 1 RO8 relay output module (for 8 irrigation valves)
Optional additional inputs and outputs	4 RO8 relay output module (for 32 irrigation valves)
Power supply connector type	spring clips
Core diameter of power supply and earth cabling	0,2 to 6 mm ² (solid) 0,2 to 4 mm ² (flexible)

Specifications (processing computer)

Processing computer	
Hardware	Compri HX 4
Operation	watertight, colour touch screen stylus pen
Languages	English (other languages available on request)
Number of start programmes	10 with 4 periods
Start dosing based on	time, radiation level, radiation sum, external measurement
Dosage based on	duration, calculated quantity
Maximum usable number of fertiliser recipes	8
Regulation can take account of splitting the irrigation valves for different tasks	yes
Overview of the measured values and settings	current and previous day
Procedures for emptying the mixing tank	no
Printer connection to print alarms and reports	no
Watchdog function	if the NutriFit HX jams, the signalling activates the connected alarm relay

Specifications pH-sensor

pH sensor	
Product	pH sensor (high pressure)
Product number	3779048
Housing	glass
Measurement principle	pH electrode
Activation sensitivity	59 mV / pH (in operating range 3..10 at 25° C)
Operating range (measurement values comply with given accuracy)	3..10
Range (sensor produces measurement values)	3..10
Accuracy (after calibration)	± 0.1 (in operating range 3..10 at 5..30° C)
Components required for the NutriFit	pH-holder 3/4" bayonet (product number 3770854) T-piece PVC 25 x 3/4" x 25 (product number 3770856)

Specifications EC sensor

EC sensor			
Product	EC sensor (single measurement, with fixing materials)	EC sensor (double measurement, with fixing materials)	EC measuring tube Priva small + NTC thermistor '1 k Ω plus 3 k Ω '
Product number	9690	9691	3779043
Use	Part to be ordered with the NutriFit delivery	Part to be ordered with the NutriFit delivery	Sensor without fixing materials
Housing	PVC and stainless steel		
Measurement principle	electrical conductivity with temperature compensation		
Operating range (measurement values comply with given accuracy)	0.1 .. 10 mS/cm		
Range (sensor produces measurement values)	0.1 .. 10 mS/cm		
Temperature compensation	2%/°C		
Accuracy (with adequate maintenance)	2%		
Cell constant (software setting to be completed)	1.23 [1/cm]		



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